

**DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
INFORMATION TECHNOLOGY OFFICE (ITO)
PLANNED PROCUREMENTS
January 2000**

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
<p>Autonomous Negotiating Teams (ANT): The ANT program addresses real-time, distributed allocation problems, in which both resources and their consumers are moving and subject to change, and have significant individual constraints on action. To solve this problem, the program utilizes highly decentralized and autonomous negotiation of tasks, roles and allocations, to provide solutions that are both good enough, and soon enough. The objective is to develop a bottom-up organization framework, the details of real-time reasoning-based negotiation, and to evaluate the approach via challenge problems. Application domains of interest to the Department of Defense include logistics, dynamic planning and scheduling, and reactive (autonomous) systems that assign defensive weapons to moving targets.</p>	TBD	<p>BAA 00-24 Proposals due: 2/10/00</p> <p>Total program: 3-4 years</p>	<p>Dr. Janos Sztipanovits ITO</p>
<p>Program Composition for Embedded Systems (PCES): PCES is developing new technology for programming embedded systems with greatly reduced programming effort and reduced brittleness of the resulting code. Programs for real-time embedded weapons systems are highly tailored to assure cross-cutting properties such as synchronization of concurrent operations; processor fault isolation; sensor input and actuator output timing constraints; safe and efficient cache, register, and memory management. This project is developing technology for programming these cross-cutting aspects or properties and for introducing them into the core code that implements functional requirements of the system. The goal is a set of reusable software for aspect suites, supported by software analysis and composition tools that enable reasoning about the complex interactions and tradeoffs among cross-cutting aspects and enable safe code manipulation. A spectrum of automation will be developed in order to address dynamic composition for distributed and mobile code, as well as resident on-board code.</p>	TBD	<p>BAA 00-23 Proposals due: 1/24/00</p> <p>Total program: 4 years</p>	<p>Dr. Helen Gill ITO</p>

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<p>Network Modeling and Simulation: The goal of this program is to create Network Modeling and Simulation Tools that are trustworthy to predict, with known accuracy, network behavior at varying time scales and for different network sizes and technology composition. These tools, along with an appropriate on-line network measurement methodology to be developed in the program, will provide a basis for on-line network control, dramatically reducing the time and cost required for functions such as parameter tuning, fielding new and situation specific protocols, and quality of service provisioning. These tools can also be harnessed to significantly improve the efficiency of network operational functions such as planning, service provisioning, and failure analysis.</p>	TBD	<p>BAA 00-18 Proposals due: 2/1/00</p> <p>Total program: 4 years</p>	<p>Dr. Sri Kumar ITO</p>
<p>Model-Based Integration of Embedded Software (MBIES): The goal of MBIES is to establish composability of large, embedded software applications for temporal, noise, synchronization and dependability constraints. To do this we will use customizable frameworks and model-based integration technology. The key technology components to be developed are model-based programming environments and model-based generators. Model-based programming environments will facilitate the construction and managing of integrated models of the physical end information processes. Model-based generators will translate relevant aspects of models to customization interfaces of framework components and to input languages of analysis tools. The model-based integration technology will enable us to compose embedded systems satisfying cross cutting physical constraints. The primary advantage will be drastically reduced development and system integration cost. These advantages will be demonstrated in the context of avionics and vetronics challenge problems.</p>	TBD	<p>BAA 00-19 Proposals due: 1/31/00</p> <p>Total program: 4 years</p>	<p>Dr. Janos Sztipanovits ITO</p>

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<p>Next Generation Internet: The goal of this program is to develop technologies that will enable networks to dramatically scale in size, speed and reach, focusing especially on their ability to robustly accommodate extreme ranges of user demand and ensure end-to-end performance metric. We target technologies which will be enablers of new services that meet DoD requirements, such as automated capability to reconfigure large high bandwidths based on demand, as well as development of software tools that can be deployed to enhance DoD-built and -managed networks. Our goal will be accomplished through three tasks: Network Engineering, SuperNet Technology, and Enhanced Networked Applications.</p>	TBD	<p>BAA 00-21 Proposals due: 2/2/00</p> <p>Total program: 2 years</p>	<p>Dr. Mari Maeda ITO</p>
<p>Sensor Information Technology: The goal of this program is to create a new class of innovative and effective software for distributed micro-sensor networks, for use in tactical and surveillance applications as well as for condition-based maintenance. A major challenge is the development of software technologies that can be applied to a variety of sensor nets, on ground and air, on buildings and bodies, capable of carrying out multiple missions, and enabling rapid and accurate detection of threats. Another challenge is to design reliable, networked, embedded systems retaining only supervisory control, while automating traditional “in-the-loop” tasks.</p>	TBD	<p>BAA 00-25 Proposals due: 2/7/00</p> <p>Total program: 3 years</p>	<p>Dr. Sri Kumar ITO</p>
<p>Mobile Autonomous Robot Software: Mobile autonomous robots are severely limited by the lack of embedded software technologies for intelligent perception and control. This program seeks to develop those missing software technologies needed to enable mobile robots to operate in complex environments without today’s dependence on synchronous, remote control. MARS robots will be able to synthesize the desirable features of both symbol-mediated and sensor-mediated control, so as to exploit both a priori, human-supplied (symbolic) information as well as real-time, sensor-derived data. They will interact naturally with humans, correctly perceive their environment, adapt their actions to that environment, and improve their measurable capabilities as a consequence of training and/or experience (learning).</p>	TBD	<p>BAA 4QFY00</p> <p>Total program: 5 years</p>	<p>Dr. Mark Swinson ITO</p>

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Web-In-A-Box: The goal of this program is to support Information Centric Warfare by providing real-time access to global information under constraints of limited bandwidth and loss of connectivity. The Web-in-a-Box program is: (1) developing next generation proxy servers to monitor the global web for updates of interest to the various remote locations and to disseminate this information to the interested location, intelligently utilizing bandwidth; and (2) developing local information repositories to provide local real-time access to critical information and serve as an archive under total loss of connectivity.	TBD	BAA 3QFY00 Total program: 3 years	Dr. Jean Scholtz ITO